MULTIMEDIA UNIVERSITY®

STUDENT ID NO

MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

TRIMESTER 2, 2019/2020

HBC1021 – BIOCHEMISTRY II

5 March 2020
9:00 AM – 11:00 AM
(2 Hours)

INSTRUCTIONS TO STUDENTS

1. This paper consists of **4 pages** (including the front page)
2. This paper consists of **5 Short Answer Type questions**. All questions carry equal marks (10 marks per question).
3. Answer **ALL QUESTIONS.**
4. Print your answers **clearly** and **neatly** in the Answer Booklet provided.

Question 1

A. What is the difference between autotrophs and heterotrophs? [2 marks]

B. List ONE electron carrier each for catabolism and anabolism. [1 mark]

C. List TWO ways for regulation of enzyme activities in metabolic pathway. [1 mark]

D. During glycolysis, NADH is formed from NAD^+. Why is regeneration of NAD^+ important for glycolysis? [1 mark]

E. List TWO sugars, other than glucose which can enter glycolysis. [1 mark]

F. List TWO metabolic fates of pyruvate after post-glycolysis process under anaerobic condition. [2 marks]

G. Why is citric acid cycle not called a pathway? [1 mark]

H. List molecule that activates or inhibits citric acid cycle, ONE for each. [1 mark]

Question 2

A. What is the difference between substrate-level phosphorylation and oxidative phosphorylation? [2 marks]

B. How are reactive oxygen species generated? Why are these reactive oxygen species harmful to cells? [2 marks]

C. What is the effect of ADP on rate of oxidative phosphorylation? [1 mark]

D. The pentose phosphate pathway is composed of two distinct stages. What are the two stages, and what are their roles? [2 marks]

E. Glucose 6-phosphate dehydrogenase (G6PDH) deficiency is one of the most common diseases caused by enzyme abnormality in humans. It affects more than 400 million individuals worldwide. Describe TWO clinical manifestations of G6PDH deficiency. [1 mark]

F. Describe briefly TWO biological roles of Cori cycle. [2 marks]

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Question 3

A. The Calvin cycle of photosynthesis is sometimes referred to as the reductive pentose phosphate pathway. Explain this statement. [2 marks]

B. Rubisco is probably the most abundant protein on earth. Describe briefly TWO strategies which may be useful to improve photosynthetic efficiency of rubisco protein. [1 mark]

C. What happens to O_2 and ATP levels when cyclic electron flow of light reaction in photosynthesis occurs? [1 mark]

D. People who consume little fat but excess carbohydrates can still become obese. How is this result possible? [2 marks]

E. Compare and contrast fatty acid oxidation and synthesis with respect to
(a) site of the process;
(b) acyl carrier. [2 marks]

F. What are statins? What is their pharmacological function? [2 marks]

Question 4

A. Differentiate between ketogenic amino acids and glucogenic amino acids. [2 marks]

B. Why are certain amino acids defined as essential for human beings? [2 marks]

C. Both proteasome and lysosome are cellular sites of protein turnover. Give TWO differences between these two biological phenomena. [2 marks]

D. What is the difference between *de novo* and salvage nucleotide synthesis pathways? [2 marks]

E. Conversion of IMP to AMP requires GTP while conversion of IMP to GMP requires ATP. Explain this requirement is important for biological system. [1 mark]

F. Why is there fewer disorders result from excess levels of pyrimidine synthesis or catabolism compared to that of purine metabolism? [1 mark]

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Question 5

A. Give TWO reasons why sometimes native producers are not used to produce secondary metabolites in bulk. [2 marks]

B. Many Asian populations have increased risk for cardiovascular diseases and diabetes mellitus, compared with Caucasians at the same BMI. Explain this statement. [2 marks]

C. What does glycemic index indicate? Why is diet with low glycemic index considered a healthy diet? [2 marks]

D. It has been shown that caloric restriction may extend lifespan in several animal model studies. Describe TWO possible mechanisms. [2 marks]

E. Exercise is a useful prescription for insulin resistance and type 2 diabetes. How does exercise help to improve the symptoms of type 2 diabetes? [2 marks]

End of paper